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NOTES ON THE REARING OF THE LARVÆ OF
POLYGORDIUS APPENDICULATUS AND ON
THE OCCURRENCE OF THE ADULT
ON THE ATLANTIC COAST
OF AMERICA.

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As the larvæ of *Polygordius* are often found in abundance at Wood's Hole, Newport, Beaufort, and along the coast of Virginia, it seems strange that the adult *Polygordius*, which has been found so often in Europe and which has been so well monographed by Fraipont, should not be taken on the coast of America.

The larvæ of *Polygordius* were quite abundant at Beaufort, N. C., during August of 1902, and through the kindness of the United States Fish Commission, I was able to collect some of these and watch their development in the Commission's new laboratory. It surprised me to find that fully developed swimming larvæ taken at night and measuring slightly less than 1 mm. in length had metamorphosed by the next morning. They were at this time 2 mm. in length, showing an increase of 1 mm. in length.

Fraipont in his monograph on *Polygordius* says that the trunk in *Polygordius appendiculatus* develops inside of the primary cuticle of the swimming larva, becoming folded more and more and that it becomes quite long before it assumes the form which is found in the later stages of development of other species. Examination of the larva which is found at Beaufort shows that this is the case.

In Fig. 1 is shown the swimming larva some time before metamorphosis. The trunk has begun to be folded and the primary cuticle is still seen unbroken along its side. As this larva develops, the trunk becomes folded more and more. This folding of the trunk and the exceptional increase in the length of the latter before the primary cuticle breaks, affords an explanation of

the seemingly rapid metamorphosis of the larva into the adult form and also it shows why the young worm immediately after metamorphosis is so much longer than the fully developed larva.

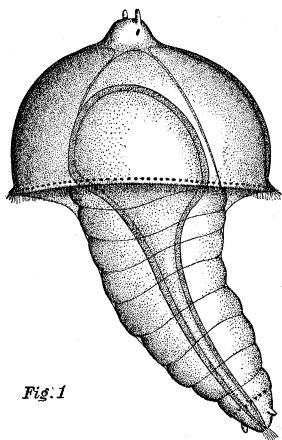


Fig. 1

FIG. 1. Larva of *P. appendiculatus*, $\times 68$.

The anal segment is of specific interest in the larva (Fig. 1) which is found at Beaufort, N. C., because it bears the beginnings of two anal filaments which are characteristic of the larva of *Polygordius appendiculatus*. Besides these organs there is on the anal segment a tuft of cilia about the anus. Anterior to the anal filaments there is a ring of glandular papillæ. A pre-anal ring of cilia was not observed.

At the suggestion of Dr. Grave, of the Johns Hopkins University, the young worms, after the completion of metamorphosis, were put into dishes with water and sand rich in diatoms. In order to obtain sufficiently rich cultures of diatoms to afford enough food for the worms, sand was obtained by means of a dredge outside of the harbor and put into aquaria jars with fresh sea water. The jars were then kept in the laboratory near a window until the sand had settled and a rich culture of diatoms had appeared as a brown layer on the top of the sand. This was then drawn off with a pipette and fed to the young worms. Under these conditions they grew rapidly and at the end of six weeks some of them had increased in length to 15 mm. Examination of the contents of the alimentary canal showed that the worms had been feeding on the diatoms.

This method of rearing the young metamorphosed larvæ was first employed by Grave to rear young Echinoderms. By this method also the writer has had good success in rearing the larvæ of *Thalassema* taken from the tow at Beaufort, N. C., and he has half-grown specimens of *Thalassema* which are living and growing under these conditions in the laboratory of Johns Hopkins University.

There is no doubt but what the diatom method is a most useful one in rearing well-developed larvæ taken from the tow.

In Fig. 2 is shown the anal segment of a *Polygordius*, 15 mm. in length, raised by the diatom method. The characteristic anal

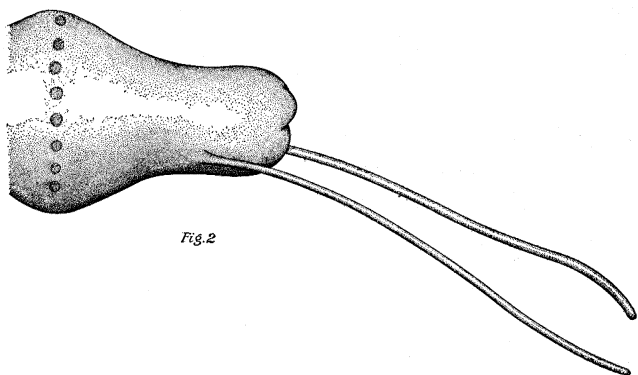


Fig. 2

FIG. 2. Anal segment of a specimen of *P. appendiculatus*, $\times 135$.

filaments in this specimen are almost three times the length of the anal segment, as in *P. appendiculatus* as figured and described by Fraipont.

Sections of the anal filaments show that they are ectodermal outgrowths surrounded by a cuticle which is continuous with that of the rest of the worm. They are without lumens and the cells seem to be like those of the ectoderm of other parts of the body of the worm. It is possible that the organs have a sensory function, although they are not at all active and are not ciliated. The ring of glandular papillæ present in the larva persists in the adult. In the oldest specimen that the writer has, the superior anal lip is not as distinctly divided into lobes as Fraipont figures, but there is some indication of differentiation into lobes.

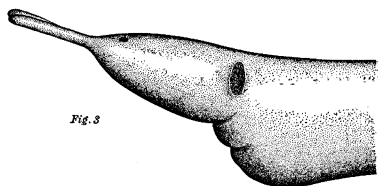


Fig. 3

FIG. 3. Cephalic segment of the same specimen as that of Fig. 2, $\times 135$.

The cephalic tentacles (Fig. 3) are seen to be without setæ and longer than in other species, as is the case in *P. appendiculatus*

Sections show that there is no circular muscle layer below the epidermis and also that there is no muscular layer enveloping the alimentary canal. Fraipont observed these facts also.

Although the worms reared by the diatom method had not reached sexual maturity, there can be no doubt but what the form is *P. appendiculatus*, since the two characteristics which distinguish this species from all others are present, namely :

The advanced stage of the development of the trunk before the primary cuticle of the larva is broken and the presence of the two filaments on the anal segment.

There is another *Polygordius* larva which has been taken in the tow at Beaufort, N. C., but its metamorphosis is different from that of *P. appendiculatus* and the anal filaments are not present. Although the writer has not attempted to rear the larva, its metamorphosis and anatomy resemble that of *P. neapolitanus*.

The *Polygordii*, raised by the diatom method, were found to be very active little worms. By means of the glandular papillæ on the anal segments, they were usually found attached to the bottom of the dish, but the rest of the body anterior to this was kept in almost continual motion, waving back and forth and often tying itself into knots.

It is not strange if *Polygordius* has not been found on this coast. In addition to the fact that they are small, thread-like worms living free in the sand, they have the habit of coiling themselves into a minute snake-like coil when disturbed. If they are not more abundant than the most abundant annelids at Beaufort, it would only be by the most painstaking search that they would be found.